APPRAISAL OF HAWAIIAN TAXONOMY

Otto & Isa Degener

"List of Flowering Plants in Hawaii," authored by Harold St. John August 30, 1973, is Memoir Number 1 of the Pacific Tropical Garden of the Island of Kauai. The book, in board covers, comprises 519 pages. It is a vade mecum for the professional botanist and advanced student interested in the taxonomy of the Hawaiian Islands. It is indispensable for every institution housing a collection of Polynesian plants. The body of the book devotes pages 9 to 13 to Gymnospermae; 14 to 132 to Monocotyledones; 133 to 369 to Dicotyledones; 369 to 374 to "New Names or Combinations"; 375 to 378 to an addendum; and finally an index ending with page 519.

"The aim of this publication is to present a list of the flowering, or higher, plants known to be in the Hawaiian flora, For each is given the scientific and common names of the plant, genus, species, and infraspecific taxon. The name of the author of the scientific name is given in full or in abbreviation, and the date of publication is added. If the plant is restricted to one or more of the Hawaiian Islands, hence a native to that region, its scientific name is printed in bold face, - - - and the islands where it occurs are listed. If it is native to the islands, but also to other regions, it is printed in bold face and is marked indig. - - -. If it is an introduced weed, it is printed in Roman type - - -. If the plant is described or mentioned in any of the four basic books on Hawaiian botany, those by Hillebrand, Rock, Degener, and Neal, a page reference to it is given. Since the date of publication of each scientific name is given, it would have been helpful also to have given the full reference to its place of publication. Although these references were verified, this detail is deemed beyond the scope of the present summary."

To be sure, full citation of species would have added to the cost and bulk of the volume quite unnecessary as such information, except for dates, is readily available in the Index Kewensis. For us the reviewers, however, full citation of trinomials ignored by the Index would have enhanced still more the value of the "List" by saving the reader the drudgery of scouring a library for such obscure references.

Because the taxonomic characters of a population of plants are so variable and various taxonomists judge the importance of characters differently, no two workers can be expected to agree fully on the precise composition of a flora. To the lay person this sincere search for truth by each variable taxonomist and his temerity to express it in print may appear as mere quibbling. The present "List" is the mature botanical judgment of the author. It is not necessarily that held by us, the reviewers, no mean emulators. With this in mind, we here do not express any botanical differences, but rather our opinions regarding orthography.

In almost 8,000 scientific plant names the reader can expect

typographical and other errors made by the author andor type setter, and never noted by the proofreader. Among such annoyances, we wish the author had used in keeping with Article 73, note 6 rather than note 5 of the International Code, the specific names kauaiensis and mauiensis rather than kavaiensis (p. 188 & elsewhere) and maviensis (p. 207 & elsewhere). According to a local gazetteer, the islands Kauai and Maui were never called "Kavai" and "Mavi." On the other hand, he erroneously ascribes the binomial Xanthium pennsylvanicum to O. Degener (p. 369) without comment when the latter expressly stated why he used "pensylvanicum." Incidentally, the correct archaic spelling "pensylvanicum" is used in Recommendation 73D of the Code.

Regarding an epithet taken from the name of a man, the author cites over eighty binomials, such as Calamagrostis Hillebrandi (p. 22) in which the specific word fails to end in "ii." He similarly cites about ten binomials such as Carex Nealae (p. 44), honoring Marie C. Neal, without using our preferred orthography "nealiae." At times incorrect specific names, such as "Eragrostis Hosakai" (p. 28) are corrected emphatically to "Hosakae"; yet a bit inconsistently such errors as "Pritchardia Munroii" (p. 58), "Cyrtandra Wawrai" (p. 314) and "Plantago Krajinai" (p. 319) fail of correction and comment. In about fifty cases where species names are of compound origin, the connecting vowel or vowels are wrong. Thus "Drymophloeus olivaeformis" is corrected to D. "oliviformis" (p. 54), yet the name "Alyxia olivaeformis" (p. 279), that of a common Hawaiian liana, remains a stumbling block for the gullible student reader. There, no correction is made. Too many connecting vowels are "iae" instead of the correct "ii." The present comment is registered with the hope that the author will make desirable changes in a future edition, and that botanists of the world will vote to alter Recommendation 73C (and many others) in the Code into retroactive mandates. It would ease such burdens to memory whether the species name of a certain Hawaiian plant is correctly spelt the archaic way "hillebrandi" and "nealae" or spelled in the more modern way "hillebrandii" and "nealiae."

The spelling of the generic names Exocarpos (see p. 148) and Sigesbeckia (see p. 366) have been conserved over all other names in spite of prior date of publication. "Eichornia" (p. 79) is an error. "Eichhornia," though strange to a reader not versed in German, is correct. A squirrel in Germany is called Eichhörnchen because, we presume, it favors living in Eichen or oak trees, and has ears each with a horn-shaped tuft of fur. The botanist Eichhorn, for whom the waterhyacinth genus was named by Kunth in 1842, we imagine, had some forebear somehow associated with the squirrel. Be that as it may, the double "hh" in Eichhornia is the proper orthography.

One of the reviewers who introduced the lovely, silky garden and street tree, the var. sericea, to Hawaii from New Providence Island (Nassau) in 1946, used the binomial Conocarpus erecta L., for the glabrous plant in the Flora Hawaiiensis in 1937. To alter "erecta" to erec us" is not a correction, but quite the opposite. Linnaeus, like many o his contemporaries, was a classical Latin scholar who considered a tre

feminine, like arbor, the Latin word for tree. Should we alter the bi- and trinomials of these trees, to be consistent we should alter the binomials Quercus alba (white oak), Q. macrocarpa (largefruited oak) and Q. rubra (red oak). To consider a "modern" genus ending in "carpus" masculine is Recommendation 75A of the Code. It is not retroactive, however, as the author St. John explains on page 206.

Botanists are human, and the author is no exception. He favors most of the opinions held by a former protégé regarding local Rubiaceae even though three or four colleagues disagree. Chromosome counts, not availabl years ago, appear to discredit some older beliefs regarding relationship

The "List" is so valuable for its many facts regarding our state of knowledge up to 1973 of the local flora that any of the above adverse remarks are trivial. The volume initially sold for $22.50; but due to a disastrous flood April 1974 all unsold copies were damaged and now sell from $5 to $15 depending on their condition. This may be the logical time for the publication of a new edition that will follow the latest precepts demanded by the International Code of Botanical Nomenclature.

The book's "Summary of the Flowering and Seed Plants in the Hawaiian Flora." page 4. prompts the following digression:

We the reviewers believe the Hawaiian Archipelago may well have boasted an endemic flora of 50,000 endemic species and infraspecific taxa before the advent of man. At that time close to 99% of the native organisms occurring in the Islands from sea coast to mountain top were endemic. The Hawaiian Islands before man's coming were truly a Paradise of the Pacific.

Man first discovered the Hawaiian Islands just a few thousand years ago. This man belongs to the Polynesian race, and brought with him during frequent voyages animals and plants. Among the former were dogs, pigs, chickens and, probably as stowaways, rats. Among the latter introductions were many plants useful as clothing, food, and medicine - mostly cultigens of Marquesan, Samoan and Tahitian origins.

As the Polynesians bred and multiplied on the choicest islands to develop into a superb new strain aptly called Hawaiian, the lowlands particularly in the drier, lee sides and the coastal valleys on the wetter, windward side became heavily populated. "Overpopulation" was tempered not by infectious diseases but rather by famine, war, infanticide, and sacrifice of men on the altar. Set fires and the pursuit of agriculture wiped out much of the original, extensive, dry forests; and *Pritchardia palm groves and shrubby plains where so many endemic taxa are usually restricted to very limited areas. Man and especially feral pigs, certainly decimated the vegetation in many areas where agriculture was not practiced. We shall not mention the slaughter for food andor feathers of flightless and other birds, and the hunting of the monk seal. Thus a few thousand years of pseudoneolithic man exerted a profound influence on the biota.

The second discovery of the Hawaiian Islands occurred during the Sixteenth Century when a Spanish galleon was shipwrecked on the Is-

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land of Hawaii - galleons have been sailing yearly between Acapulco, Mexico and Manila, Philippines for centuries. In fact, the map of the Pacific Ocean published by Vincenzo Maria Coronelli in 1696 shows a group of islands that might easily represent the Hawaiian Archipelago. Early Spanish maps likewise indicate the awareness of similar islands. The "unwritten literature" or epics of the Hawaiians handed down from father to son and from priest to priest refer to the coming of Spaniards. In fact some Hawaiians, among them a teacher, living along the Kona Coast of Hawaii maintain their relationship to some of these Spaniards. Also, natives were in possession of metal of European origin before Captain Cook's coming, and they may have had the pineapple or hala-kahiki since Spanish times. In the Museum für Völkerkunde in Berlin we inspected in 1952 a heroic statue fashioned of typical Hawaiian lava with gas cavities and olivines. It had been dug up in the early Nineteenth Century in a taro patch, so we were told, To us the figure represents a Spanish grandee, perhaps idolized by the Hawaiians. We doubt the Spaniards, however exerted any baneful influence on the endemic biota.

The third discovery of the Hawaiian Islands began with Captain Cook's landfall in 1778. This opened the Islands up to the present to two hundred years of viciously efficient extermination of endemics by the introduction of Occidental and Oriental crop plants, ornamentals, trees for timber, and aggressive Mainland weeds and plant diseases; to livestock and herbivorous game animals preferring an endemic diet; to aggressive insect pests; and to the bulldozing of vast areas for human habitation, roads, golf courses, etc. Some of such destruction of endemics is unfortunate but justifiable; yet much is inexcusable, wanton vandalism. Due to population pressure, this destruction during the last few "bulldozer decades" has been geometric rather than arithmetric in progression.

Yet despite wholesale destruction, goodly proportions of most islands are still relatively undefiled, particularly in our two National Parks, in the fogbelt too wet for crop plants and farm animals, and on the precipitous slopes. Botanists of the world should realize that the Hawaiian Islands are still the Mecca for taxonomic research - such work has hardly begun! Too often when a novelty has been discovered that does not fit any description in Hillebrand's "Flora of the Hawaiian Islands," an excellent book for the time it was published posthumously in 1888, the finder would discard it with the casual remark that endemics are hopelessly polymorphic or that his specimen represents an individual belonging to a swarm of hybrids. To us the author's statement that endemic species and infraspecific taxa number 2,668 is patently absurd; nor are we at all in agreement that "The endemic, indigenous, and adventive plants in the flora have been well collected and are now quite well known."

It has long been our conviction that the flora of the Hawaiian Islands in Captain Cook's time did not consist of a mere 2,668 taxa, but of 20,000 or more likely 30,000! Diligent monographic work on historical specimens collected since David Nelson's botanizing during Cook's voyage and diligent collecting and studying of

the presently surviving flora, should enable us to know perhaps about half the elements that were living two hundred years ago. An inkling of our assertion of the number of taxa is shown, for example, by the author's treatment of the genus Cyrtandra (Gesneriaceae), beginning on page 308. Note our tabulation, based on the "List," for the major islands of the Hawaiian Archipelago:

ISLAND	NUMBER OF TAXA	SQUARE MILES	SUMMIT IN FEET
Oahu	128	604	4,045
Maui	29	728	10,025
Hawaii	23	4,030	13,792
Kauai	22	555	5,170
Molokai	13	260	4,970
Lanai	4	141	3,370

Cyrtandra taxa are partial to wet jungles, and these peter out above the inversion layer where the terrain becomes increasingly dry. This is at about 7,000 feet elevation. Hawaii and Maui, with high mountains, nevertheless have vast rainforests. Can it be true that they harbor but 23 and 29 Cyrtandrae respectively? Though Kauai has about fifty square miles less area than Oahu, it has a somewhat greater elevation. This greater range in resulting temperature might well increase speciation. Kauai, according to the author, has 22 taxa to Oahu's 128! In fact, while Oahu with its 604 square miles has 128; the other five islands with a combined total of 5,814 square miles have only 91. The explanation for such discrepancies is not botanical, but HUMAN.

Oahu has been the center of human activity for nigh unto two hundred years. It is the seat of the capital, Honolulu, where the Bishop Museum and the University are located. Most visiting botanists resided there, and collected within easy walking, riding or driving distance of the city. Teachers, not excluding the author of the "List," scoured Oahu with their students week-ends and holidays for its botanical riches. The "outside islands," in contrast, always have been neglected. What wealth of plants must still be growing there unknown to man! What applies to Cyrtandra, relatively unknown in the Archipelago excepting on Oahu, applies more or less to the remaining native genera.

With this in mind, we appeal to the biological workers of the world to come to this Mecca to collected its neglected riches before "progress" destroys them. With the torch of knowledge flickering feebly during the last decade of questionable political ethics in Washington, Federal funds for Hawaiian taxonomy have nigh dried up. Even the fabulous Marie C. Neal Herbarium is lying fallow in Honolulu for want of funds. As botanists cannot prevent the continuous slaughter of one endemic taxon after another, they should at least attempt to collect, preserve and record as much of the Hawaiian flora that is still extant so that future generations shall better understand what a splendid Paradise of the Pacific their forebears lost.

(Courtesy, Museum für Völkerkunde, Berlin)

Presumably a Spanish grandee sculptured in Hawaiian lava

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